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ABSTRACT

A reliability study of the Brigance Comprehensive Inventory of Basic Skills (CIBS) is presented. All test-data collectors were provided onsite training in the administration and scoring of the CIBS. The sample included 85 black and 319 white students from grades two through eight, from parochial and private schools, in a southeastern metropolitan area. Test-retest reliability coefficients were computed for Forms A and B for the total group, by race, and by sex. For the sample divided by race and by sex, the coefficients ranged from .65 to .91. There were negligible differences in reliability according to sex, and only small differences according to race. Alternate forms reliability coefficients compared favorably with the reference value of .88. The component of the CIBS that was consistently least reliable was Listening Vocabulary: reliability coefficients were less than .7 for the group as a whole and for the group split by sex and split by race. Poor performance at a few grade levels also negatively affected Reading Vocabulary. It was concluded that the reliability of the CIBS is acceptable. (PN)

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A Reliability Study of the Brigance CIBS, Comprehensive Inventory of Basic Skills

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ABSTRACT

The CIBS is a popular means of providing a data based evaluation system for teaching and learning. This session described the process that was used to provide teachers with some psychometric information about the reliability of the CIBS as well as the results of that process. Not only is the CIBS a "teacher's choice" because of face validity, but it also tends to be a reliable instrument. Empirical data support was not available at the time this research was begun.

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INTRODUCTION

This paper reports one phase of an ongoing, larger research project begun in 1983 which is to be concluded in 1986. There may still be some other studies as spinoffs. This research was conducted to study the Brigance Comprehensive Inventory of Basic Skills (CIBS), a popular choice among both special education and regular classroom teachers. This report is to share empirical data to support these teachers' choices based on impressionistic data.

Rationale

Recently a college supervisor of practica students was observing in the classroom. To get an idea of curricular implementation and teacher accountability, the teacher was asked about IEP's and so forth. The teacher's response was in terms of "I haven't done all that special education stuff but I can show you how my students do on the Brigance."

Many educators prefer a criterion referenced test for classroom decision making. The usefulness of criterion referenced tests to the instructional process in general and teaching in particular is for most of us self evident. The questions regarding psychometric properties of criterion referenced tests are usually less about validity and more about reliability because of the way criterion referenced tests are typically developed.

The Brigance or CIBS is often a mainstay of teacher decision making. There are classroom teachers who would choose the CIBS regardless of its good psychometric properties. The reasons these teachers give include among others how comprehensive the test is and how well functional areas are identified. Ease of communicating the results to parents is high on the list of reasons as well as ease of maintaining records and information retrieval.

Purpose

The purpose of this report was to reinforce the classroom teachers'choice of the CIBS by providing some psychometric data as evidence for them and test selection committees. More specifically, the question to address was How reliable is the CIBS? Since the CIBS is often used to monitor learning status changes, the alternate forms reliability coefficient was computed.

PROCEDURE

All test-data collectors were provided onsite training in the administration and scoring of the CIBS. The actual data collection was supervised by an experienced, local educational diagnostician and teacher educator. All testing was conducted with minimum distraction in familiar and appropriate settings.

Test-retest reliability coefficients were computed for the total group, by race, and by sex. Where results were either not as expected or not calculable, additional data was collected. Test protocols were rescored. Problematic statistical analyses were rerun. These included, for example, Listening Comprehension at the seventh grade level and Math Computation at grades two and six. Although the Math Computation reliability was calculated as .66 for the original group, reliability coefficients could not be determined for the children in grades two and six by the computer program as run.

This data had not been preprocessed by systematic visual inspection to eliminate obvious recording errors. When that was done and the above corrections were accomplished, the analyses ran without further problems. The bottom line, of course, is that reality demands a trade-off among the competing requirements for accuracy and resources. In this study, data was collected and collated as reported.

Sample Selection and Size

For statistical purposes, a minimum sample size of 40 was sought at each grade level. This was achieved with no exceptions. Larger numbers might be desirable for greater generalizability.

Children initially selected for this study resided in a major, southeastern metropolitan area. There were students from both parochial and private schools. The sample was initially chosen to reflect national percentages in terms of sex and race according to 1980 census data; that is to say, roughly one to one sexually and four (white) to one (black) racially.

Some subjects were dropped when the tests were rescored as another check for additional confidence and accuracy. These changes affected the sex and race ratios which did not remain balanced at each grade level.

The final breakdown of subjects is displayed in the following two tables. Similar information is reported in both tables but the arrangement with and without grade level is for convenience.

Subjects' Sex and Race

	Sex		
Race	Male	Female	Total
Black	36	49	85
White	177	144	319
Sums	211	193	404

Subjects' Sex and Race by Grade Levels

	Race		Sex		
Grade	Black	White	Male	Female	Total
Second	18	35	26	27	53
Third	10	37	26	21	47
Fourth	9	44	24	29	53
Fifth	13	72	48	37	85
Sixth	16	64	41	39	80
Seventh	10	32	20	22	42
Eighth	9	35	26	18	44
Sums	85	319	211	193	404

Data Analysis

How well an instrument measures the nominal trait is a fundamental question. If a test doesn't measure what it claims to measure, then reliability is irrelevant. But that is the problem of validity.

Observed test scores are a function not only of the variable to be measured but also of systematic variance, random error, and uncontrolled mistakes. Test performance was summarized with correlation coefficients as an adjunct to perceived validity.

The statistical programs were run on both mainframe and microcomputers. Version 8.1 of SPSS and the ABC microcomputer package of programs were used for data analysis. The ABC statistical program, available for a nominal fee from the University of Michigan, was particularly easy to use as it was patterned after SPSS.

RESULTS

During initial development of the Brigance Comprehensive Inventory of Basic Skills (CIBS), field testing and the jury system were used to stay close to the proscribed task and to determine test contents. The goal was content validity because the CIBS was not intended for special class placements nor predictive purposes but instructional decision making.

The question to answer with this research was how reliable is the CIBS? Another way of stating that is whether or not Form A and Form B of the CIBS are of similar difficulty. Will students score similarly on both forms?

A product moment correlation was computed for each subtest not only for the total sample but also for race, grade level and sex. The distribution of subjects when cross classified by sex and race at each grade level produced subcategories too small for reliable results. These were not reported, therefore.

The answer to the question of reliability is not a simple yes or no. The degree to which the two forms of the test are of similar difficulty was indicated by the correlation coefficients. The CIBS was, of course, more reliable for some of the components and for some student classifications. The answer to the question of reliability is positive, but needs some qualification.

Discussion

A point to consider when examining these reliability coefficients is that the method of computation also influences the value of the coefficient. The reported alternate forms reliability coefficients were conservative estimates and can be expected to hold under further replication. Another consideration for interpreting the results that appear in the tables which follow is this. When the subjects were tested and after a brief interval retested on the same test items (Spelling), their reliability was .88, not 1.00. The value .88, therefore, might be considered a reference value for comparison purposes.

Overall, the reliability of the CIBS was acceptable. For the sample divided by race and by sex, the coefficients ranged between .65 and .91. There were negligible differences in reliability according to sex. There were only small differences according to race. This of course was how it should have been.

Tables of correlation coefficients are displayed on the following pages. The data for the total group is reported first, by sex next, and then by race.

Alternate Forms Reliability for Components of the Comprehensive Inventory of Basic Skills
Total Group

Variables:
- WRECA (word recognition pretest)
- WRECB (word recognition post-test)
- ORALA (oral reading pretest)
- ORALB (oral reading post-test)
- RVOCA (reading vocabulary pretest)
- RVOCB (reading vocabulary post-test)
- RCOMA (reading comprehension pretest)
- RCOMB (reading comprehension post-test)
- LSVOA (listening vocabulary pretest)
- LSVOB (listening vocabulary post-test)
- LSCMA (listening comprehension pretest)
- LSCMB (listening comprehension post-test)
- MACMA (math computation pretest)
- MACMB (math computation post-test)
- MWPBA (math word problems pretest)
- MWPBB (math word problems post-test)

Missing data: Pairwise

n's / r's	WREC A	WREC B	ORAL A	ORAL B	RVOC A	RVOC B	RCOM A	RCOM B
WRECA	354	354						
WRECB	.89	354						
ORALA			351	351				
ORALB			.89	351				
RVOCA					346	346		
RVOCB					.70	346		
RCOMA							348	348
RCOMB							.81	348

n's / r's	LSVO A	LSVO B	LSCM A	LSCM B	MACM A	MACM B	MWPB A	MWPB B
LSVOA	353	353						
LSVOB	.67	353						
LSCMA			350	346				
LSCMB			.80	347				
MACMA					346	346		
MACMB					.79	347		
MWPBA							347	347
MWPBB							.74	347

Alternate Forms Reliability for Components of the Comprehensive Inventory of Basic Skills

Males Only

n's / r's	WREC A	WREC B	ORAL A	ORAL B	RVOC A	RVOC B	RCOM A	RCOM B
WRECA	182	182						
WRECB	.88	182						
ORALA			180	180				
ORALB			.89	180				
RVOCA					177	177		
RVOCB					.71	177		
RCOMA							178	178
RCOMB							.81	178

n's / r's	LSVO A	LSVO B	LSCM A	LSCM B	MACM A	MACM B	MWPB A	MWPB B
LSVOA	181	181						
LSVOB	.67	181						
LSCMA			178	175				
LSCMB			.80	176				
MACMA					177	177		
MACMB					.79	177		
MWPBA							177	177
MWPBB							.72	177

Females Only

n's / r's	WREC A	WREC B	ORAL A	ORAL B	RVOC A	RVOC B	RCOM A	RCOM B
WRECA	172	172						
WRECB	.91	172						
ORALA			171	171				
ORALB			.89	171				
RVOCA					169	169		
RVOCB					.69	169		
RCOMA							170	170
RCOMB							.82	170

n's / r's	LSVO A	LSVO B	LSCM A	LSCM B	MACM A	MACM B	MWPB A	MWPB B
LSVOA	172	172						
LSVOB	.66	172						
LSCMA			172	171				
LSCMB			.82	171				
MACMA					169	169		
MACMB					.79	170		
MWPBA							170	170
MWPBB							.76	170

Alternate Forms Reliability for Components of the Comprehensive Inventory of Basic Skills

White Students

n's / r's	WREC A	WREC B	ORAL A	ORAL B	RVOC A	RVOC B	RCOM A	RCOM B
WRECA	279	279						
WRECB	.89	279						
ORALA			279	279				
ORALB			.88	279				
RVOCA					271	271		
RVOCB					.70	271		
RCOMA							273	273
RCOMB							.81	273

n's / r's	LSVO A	LSVO B	LSCM A	LSCM B	MACM A	MACM B	MWPB A	MWPB B
LSVOA	278	278						
LSVOB	.65	278						
LSCMA			276	273				
LSCMB			.80	273				
MACMA					272	272		
MACMB					.80	272		
MWPBA							272	272
MWPBB							.72	272

Black Students

n's / r's	WREC A	WREC B	ORAL A	ORAL B	RVOC A	RVOC B	RCOM A	RCOM B
WRECA	75	75						
WRECB	.91	75						
ORALA			72	72				
ORALB			.91	72				
RVOCA					75	75		
RVOCB					.70	75		
RCOMA							75	75
RCOMB							.84	75

n's / r's	LSVO A	LSVO B	LSCM A	LSCM B	MACM A	MACM B	MWPB A	MWPB B
LSVOA	75	75						
LSVOB	.71	75						
LSCMA			74	73				
LSCMB			.84	74				
MACMA					74	75		
MACMB					.74	75		
MWPBA							75	75
MWPBB							.77	75

The alternate forms reliability coefficients compared favorably with the reference value of .88. The component of the CIBS that was consistently least reliable was Listening Vocabulary. The reliability coefficients for Listening Vocabulary were less than .7 for the group as a whole and for the group split by sex and split by race.

Poor performance at a few grade levels also negatively affected Reading Vocabulary. Some shrinkage of coefficients computed by grade levels was expected.

Alternate Forms Reliability for Components of the Comprehensive Inventory of Basic Skills by Grades

	Grade Levels						
Component	2	3	4	5	6	7	8
WREC	83	81	76	83	84	89	87
ORAL	86	81	71	85	87	91	85
RVOC	53	41	53	53	66	64	71
RCOM	70	76	63	77	80	58	66
LVOC	47	27	38	40	40	71	44
LCOM	66	78	67	72	79	64	77
MCOM	61	39	40	41	56	66	74
MWPB	57	52	32	64	58	52	75

Note: Decimal points have been omitted in this table.

SUMMARY

The CIBS is a popular means of providing a data based evaluation system for teaching and learning. This report described the process used to provide teachers with psychometric information about the reliability of the CIBS as well as the results of that process. At the time this research was initiated, empirical data to support teachers'preference for the CIBS was not available.